

AMENDMENT TO THE CLAIMS

1. (currently amended) A method for inspecting portion of a substrate to be inspected, the method comprising:

generation of N multi-pixel incident electron beams;

directing the N multi-pixel incident electron beams through N beam separators in a first direction;

focusing the N multi-pixel incident electron beams onto N ~~areas of~~ beam spots on the substrate, wherein multiple pixels are included within each beam spot;

directing electrons emitted from the N ~~[[areas]]~~ beam spots through the N beam separators in a second direction so as to separate the emitted electrons from the incident beams;

detecting the emitted electrons using N multi-pixel detector arrays, wherein each detector array detects multiple pixels from one of the beam spots in a parallel manner; and

translation of the substrate in a path that covers approximately 1/N of the portion of the substrate to be inspected.

2. (original) The method of claim 1, wherein the portion of the substrate to be inspected comprises all integrated circuit dies on a wafer.

3. (original) The method of claim 1, wherein the portion of the substrate to be inspected comprises a fraction of dies on a wafer.

4. (currently amended) An inspection system for inspecting a specimen, the system comprising:

a plurality of electron sources, each said source configured to generate a multi-pixel incident beam;

a plurality of objective lenses, each said objective lens configured to focus a multi-pixel incident beam onto a corresponding ~~region of~~ beam spot on the specimen, wherein multiple pixels are included within each beam spot and impingement of said incident beam causes emission of electrons from the ~~region~~ beam spot; and

a plurality of multiple-pixel electron detectors, each said detector configured to detect the multiple pixels in parallel ~~these electrons emitted from a corresponding region~~ from electrons emitted from one of the beam spots; and

a plurality of beam separators, each said separator configured to direct one of the multi-pixel incident beams in a first direction from a corresponding electron source to a corresponding objective lens and to direct said emitted electrons in a second direction from the corresponding objective lens to a corresponding multiple-pixel electron detector.

5. (currently amended) The system of claim 4, further comprising a translation mechanism for translating the wafer under said plurality of incident beams such that the corresponding ~~regions~~ beam spots are scanned across the wafer.

Claims 6-8. (canceled)

9. (currently amended) A method for inspecting substrates with increased throughput to detect defects in at least one patterned layer thereon, the method comprising:

providing a plurality of multi-pixel incident beams;

directing the incident beams towards a surface of a substrate;
emission of electrons due to impingement of the incident beams onto
~~corresponding areas of~~ beam spots on the surface;
bending said emitted electrons towards a plurality of multi-pixel detector
arrays so as to separate said emitted electrons from the incident beams;
detecting in parallel said emitted electrons from said ~~[[areas]]~~ beam spots
using the plurality of detector arrays, wherein each detector array detects
multiple pixels from one of the beam spots in a parallel manner; and
processing in parallel data collected by the plurality of detector arrays.

10. (canceled)

11. (original) The method of claim 9, further comprising:
translation of the substrate in a path such that the plurality of incident
beams are scanned across the surface of the substrate.

12. (currently amended) The method of claim 11, wherein the plurality
of incident beams comprises N incident beams, and wherein an inspected area
during the translation comprises approximately N times an area covered by a
translation path of a single ~~incident beam~~ beam spot.

13. (original) The method of claim 12, wherein N is at least two.

14. (original) The method of claim 13, wherein N is no more than fifty.

15. (original) The method of claim 9, wherein at least one incident
beam comprises incident electrons.

Claims 16-17. (canceled)

18. (currently amended) The method of claim 9, wherein the processing in parallel comprises comparison of the collected data from each ~~[[area]]~~ detector array with another set of data.

19. (original) The method of claim 18, wherein the comparison comprises alignment, differencing, filtering, and defect location.

20. (currently amended) An electron-emission inspector apparatus having increased throughput for inspecting semiconductor wafers, the apparatus comprising:

a first column for directing a first multi-pixel incident beam onto a first multiple-pixel ~~region~~ beam spot of a wafer, wherein impingement of said first incident beam causes emission of electrons from the first ~~region~~ beam spot so as to generate a first multi-pixel emitted beam;

a first multiple-pixel electron detector configured to detect in parallel pixels of the first multi-pixel emitted beam;

a first beam separator in the first column which is configured to separate the first multi-pixel emitted beam from the first multi-pixel incident beam;

a second column for directing a second multi-pixel incident beam onto a second multiple-pixel ~~region~~ beam spot of the wafer, wherein impingement of said second incident beam causes emission of electrons from the second ~~region~~ beam spot so as to generate a second multi-pixel emitted beam;

a second multiple-pixel electron detector configured to detect in parallel pixels of the second multi-pixel emitted beam; and

a second beam separator in the second column which is configured to separate the second multi-pixel emitted beam from the second multi-pixel incident beam.

21. (original) The apparatus of claim 20, further comprising:
a first processor system for processing data from said first detector to inspect for defects; and
a second processor system for processing data from said second detector to inspect for defects.

22. (currently amended) The apparatus of claim 21, further comprising a translation system for translating the wafer under said first and second incident beams such that the first and second multiple-pixel regions beam spots are scanned across the wafer.

23. (previously presented) The apparatus of claim 20, wherein the first and second incident beams each comprises incident electrons, and wherein the first and second columns each further comprise an objective lens.

Claims 24-26. (canceled)

27. (currently amended) The apparatus of claim 23, wherein the electrons emitted from the first and second regions beam spots comprise secondary electrons.